Research Memorandum 76-25

PREDICTING PEER EVALUATIONS FROM BIOGRAPHICAL INFORMATION

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U. S. Army

Research Institute for the Behavioral and Social Sciences

October 1976

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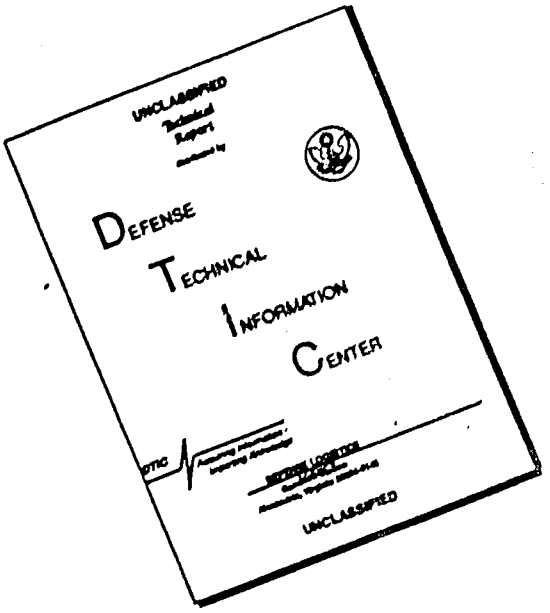

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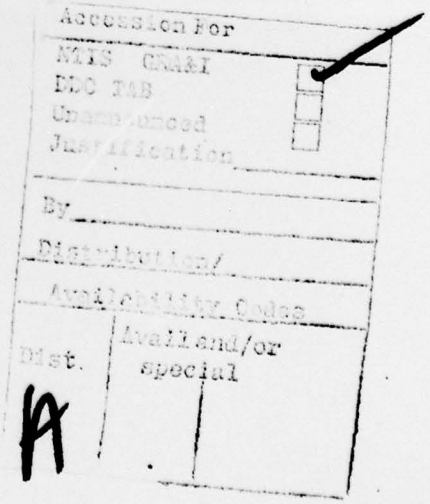

Army Project Number
2Q763731A768

Performance-Based
Skill Development

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PREDICTING PEER EVALUATIONS FROM BIOGRAPHICAL INFORMATION

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ARI-RM-76-25

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PREDICTING PEER EVALUATIONS FROM BIOGRAPHICAL INFORMATION

Peer evaluations have long been of interest to military behavioral science researchers. Initially, concern was with the validity and reliability of peer evaluations for use in the assessment of leadership ability and job proficiency. Findings resulted in the adoption of peer ratings as an important element in leadership assessment in several Army programs, most important among them being the U.S. Military Academy and Officer Candidate Schools (OCS).

Concurrently, researchers began an examination of issues related to bias in the peer evaluation process. These research programs have dealt primarily with the effects of race and friendship on the evaluation process. Cox and Krumboltz (1958) investigated the effects of racial bias on peer ratings of leadership ability. With a sample comprising 469 whites and 64 blacks distributed across 9 flight training teams in the Air Force, they examined the extent to which the race of a ratee affected the rating score he received from both his black and his white peers. In the main, the data supported the hypothesis that individuals of a given race receive higher mean ratings from members of their own race than from members of the other race. This finding, however, did not hold for all flight training teams. Over all teams, the two races were able to reach substantial agreement with regard to the rank ordering of individuals on leadership ability ($r = .76$). The researchers concluded that the bias observed was in no way complete, and that for practical purposes the validity of the peer evaluation process was not violated by what bias did exist. Similar conclusions have been reached by other researchers working in both military (DeJung and Kaplan, 1962) and industrial (Schmidt and Johnson, 1973) settings.

Hollander and Webb (1955) collected peer ratings on leadership, friendship, and followership from 187 Naval Aviation Cadets. Their results led them to conclude that leadership ratings were not a function of friendship ties when leadership was highly correlated with followership. The independence of leadership ratings from friendship ties was given additional support in subsequent research using OCS students' peer evaluations of leadership qualities to predict OCS academic averages (Hollander, 1956).

The present research was designed to broaden the simultaneous examination of potential bias-producing variables by an assessment of the relationship of selected biographic variables to peer evaluation scores.

METHOD

SAMPLE

Subjects were enlisted members of the 27th Brigade, 42nd Division of the New York State National Guard. Data were collected at Fort Drum, New York, during the annual two-week training period of the 27th Brigade. The participating units were not, however, regular training units. The

companies chosen were regularly constituted National Guard units whose personnel were assigned on a long-term basis. Five platoons were selected from the 27th Brigade to be representative of various combat and combat support units. Table 1 shows the company and number of individuals sampled. Since the data collection was carried out in the field during breaks in the training schedule, situational factors made it impossible for all the designated Guardsmen to participate in the procedure, resulting in a reduced N of 79.

Table 1

PLATOONS SELECTED AND NUMBER OF PARTICIPANTS FROM EACH PLATOON

Platoon	N
Co. D, 102nd Medical Battalion	19
Co. B, 1/127th Armor Battalion	11
Headquarters and Headquarters Co., 1/108th Infantry	20
Co. A, 1/174th Infantry	17
Combat Support Co., 2/108th Infantry	12
	79

VARIABLES

Data were collected using two instruments. The Guardsmen were first directed to fill out a biographic survey which tapped demographic information on their educational, vocational, and military backgrounds. The specific variables were: age, level of education, military rank, length of time in the National Guard, length of time in their present unit, and whether a squad leader or not.

Immediately following completion of the biographic survey, the men were given an associate (peer) evaluation form. They were instructed to choose from among the other members of their platoon the six individuals they considered best at getting the job done and the six they considered worst at getting the job done. Choices were recorded on optical scanning answer sheets. The nominations were converted to a numerical score referred to here as the peer evaluation score.[1]

RESULTS

A set of Pearson product-moment correlation coefficients was calculated in order to examine the degree and direction of the interrelationship of the biographic variables and the relationship between each of the biographic variables and the peer evaluation scores. The results presented in Table 2 demonstrate that the biographic variables are all significantly correlated with the peer evaluation scores. The most striking of these relationships is between the peer evaluation score and military rank ($r = .61$).

Table 2

ZERO-ORDER INTERCORRELATION MATRIX FOR BIOGRAPHIC AND PEER EVALUATION VARIABLES
(N = 76)

	AGE	EDUCATION	RANK	TIME IN GUARD	TIME IN UNIT	LEADERSHIP POSITION
Education	.38*					
Rank	.53*	.45*				
Time in Guard	.52*	.26**	.50*			
Time in Unit	.40*	-.02	.24**	.67*		
Leadership Position	.38*	.23**	.61*	.27**	.06	
Peer Evaluation Score	.49*	.42*	.61*	.43*	.44*	.46*

* $p \leq .001$

** $p \leq .05$

[1] The conversion formula used was: Peer Score = $\frac{3(H) + L + 2(N - H - L - 1)}{N - 1}$,
where H = number of high nominations, L = number of low nominations, and N = number of subjects in the peer rating group.

The biographic variables were found to be highly interrelated. In order to determine if the various biographic variables were independently accounting for their high correlation with the peer evaluation scores, a set of partial correlation coefficients was computed in which the relationship between any given biographic variable and the peer evaluation score was assessed by controlling for other biographic variables. Table 3 shows that controlling for rank alone, or for rank in combination with time in unit, could reduce the correlation of the other variables to nonsignificance. The correlation with rank could not be reduced below $r = .37$ ($p \leq .001$), regardless of which controlling variables were used.

Table 3

PARTIAL CORRELATION BETWEEN BIOGRAPHIC VARIABLES AND PEER EVALUATION SCORES (N = 76)

BIOGRAPHIC VARIABLE	CONTROLLING FOR	$r_{partial}$
AGE	RANK & TIME IN UNIT	.15
EDUCATION	RANK	.22
TIME IN GUARD	RANK	.19
TIME IN UNIT	RANK	.22

A step-wise multiple regression procedure was used to assess the relative powers of the biographic variables to predict peer evaluation scores. These results, presented in Table 4, indicate that rank, time in unit, and education contributed significantly to the prediction equation. An analysis of the increase in predictability that could result from an equation which contains those three variables and leadership position over an equation which includes only the three former variables indicates the nonsignificant contribution of leadership position. Additional evidence for the lack of practical significance of leadership position, time in Guard, and age in predicting peer evaluations is given by the summary section of Table 4 where "R^2 change" gives the increase in total variance accounted for by each variable. From this same section of Table 4, it is clear that rank is the primary contributor to the prediction equation, followed by time in unit and education as distant second and third contributors.

Table 4

REGRESSION ANALYSIS PREDICTING PEER EVALUATION SCORES FROM BIOGRAPHIC VARIABLES (N = 76)

VARIABLES IN THE EQUATION	B	BETA	STD ERROR B	F
RANK	17.57	0.33	6.62	7.05*
TIME IN UNIT	27.45	0.46	7.03	15.25**
EDUCATION	8.48	0.26	3.15	7.26*
LEADERSHIP POSITION	21.15	0.20	11.07	3.65***
TIME IN GUARD	10.99	0.19	7.52	2.14***
AGE	0.79	0.05	1.59	0.25***
CONSTANT	97.60			

R	0.74
R^2	0.55
STD ERROR	32.39

ENTIRE EQUATION:
$F(6,69) = 13.88$
($p \leq .001$)

SUMMARY

VARIABLE	MULTIPLE R	R^2	R^2 CHANGE
RANK	.61	.3745	.375
TIME IN UNIT	.68	.4655	.091
EDUCATION	.71	.5075	.042
LEADERSHIP POSITION	.73	.5323	.025
TIME IN GUARD	.74	.5453	.013
AGE	.74	.5470	.002

*$p \leq .01$
**$p \leq .001$
*** N.S.

DISCUSSION

Given the strong relationship between individuals' rank and their peer evaluation scores, the major question was how reasonable it is to expect such a relationship. A major premise of the peer nomination or rating process is that members of the group are able to compare the proficiency of group members in the performance of their jobs. With each advancement to higher rank, the individual essentially performs a different job, if not in task content, then in the responsibilities associated with his formal position. Therefore, within any given rank there should be a distribution of peer scores such that some individuals are rated "best" and others "worst" at performing their job. When this distribution does not occur, one possible inference is that bias has been introduced into the evaluation process. In this case, individuals of the higher ranks were rated "best" at their jobs and individuals of the lower ranks were rated "worst" at their jobs. It may be inferred that the members of the group were not evaluating each individual based upon the job behaviors associated with each ratee's actual job, but rather that each rater was redefining the term "job" in such a manner as to arrive at one set of job behaviors which could be applied commonly across ranks to all group members.

One explanation for the workings of this bias is that it may be due to a leveling effect. Essentially, this is an extrapolation of Simmel's concept of social leveling (Wolff, 1950). If a group of individuals are to rate each other on how well each performs his job, yet these same individuals perform different jobs, then the evaluation must be based upon the lowest level of job behaviors common to all members of the group. Further, if the original promotion system is valid, then each member of a given rank must have first demonstrated his proficiency at each lower rank, the best persons at any given rank being promoted to the next higher one. When the evaluation is comparative across ranks, only what is required at the level of the lowest rank found in the group is a common denominator of job behaviors for all ratees. This common level of behavior becomes the definition of "job" for the evaluation process. Given this redefinition of "job" away from the ratee's actual job to a lower level of behaviors common to all ratees, individuals of higher rank are seen as best at the "job" and those of the lowest ranks are less likely to be seen as best at the "job."

A related and perhaps more plausible explanation is that, given that individuals at different ranks perform different jobs, the raters could not be expected to have complete knowledge of what all the jobs entail. The raters must then rely upon social indicators of proficiency on the job, redefining "job" as that of being a Guardsman. The definition of job is then broad enough to include everyone in the group in the evaluation process. In this case, the ratee's rank is the social indicator of proficiency at being a Guardsman, as is also, to a lesser extent, length of time on the job (time in unit).

The validity of either of the above explanations as to how the effect of rank operated could not be determined from the data. Such a determination would require an analysis of the underlying process by which raters made their evaluations and nominations. This effect poses no problem when ratings are secured during basic training or in any similar situation when the group members are performing essentially identical jobs. However, in the military setting, rank by definition designates unequals, both in regard to formal status and the job to be performed.

The implication to be drawn from the present data is that only those of equal rank are by definition and for practical purposes equal, and therefore only these are true peers. Further, the peer evaluation process itself becomes invalidated to the extent that "peers" are not defined to include only true peers. Under conditions similar to those of the present analysis (that is, operational units), it would be preferable to define peer groups within military rank. In any situation where biographic characteristics are deemed to be independent of the specific evaluation purpose yet there is a high degree of relationship between the two, it is advisable to use such biographic information to define the true peer group boundaries.

SUMMARY

A total of 79 National Guardsmen took part in research to analyze the relationship of biographic data to the peer evaluation process. Significant correlation was found between each biographic variable and the evaluation score. However, partialling rank and time in unit out of these relationships reduced the correlation to nonsignificance. In a multiple regression analysis, rank, length of time in unit, and education accounted for 51% of the variance in peer evaluation scores. The results are discussed in terms of leveling and social indicator effects which may be sources of bias in the evaluation of peer job performance. Where such bias effects are found, the bias-producing variables should be treated as delineators of true peer groups.

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